OCTOBER 1967
Vol. 33 No. 3

# soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

**CONSERVATION EQUIPMENT**

Industry cooperation Farm examples

**A river authority acts**

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE

October 1967 Vol. 33, No. 3

COVER: Special grass drills, designed to handle unusual seeds with precision, are used to seed native grasses on land retired from cultivation.

# soil conservation

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## *Tools for the job . . .*

Conservation brings new problems to farmers. One of the most persistent is that new kinds of tools are needed to perform the new kinds of operations required to control runoff and protect soil.

SCS Conservationist G. E. (Jerry) Ryerson joins with Industrialist D. A. McAllister in recording (p. 57), we believe for the first time, the history of cooperation of the equipment and contracting industries with conservation districts, farmers, and conservationists in meeting this problem.

As an equipment engineer, Jerry for many years shared liberal portions of American ingenuity with other conservationists, farmers, and designers in adapting old, and devising new equipment for new jobs.

**Action:** Conservation needs not only new tools of iron and steel, but also new forms of human institutions to achieve community objectives. Information Specialist Dale Allen reports as an example from Texas (p. 51) how SARA, the San Antonio River Basin Authority, makes watershed programs work.

**Teaching:** Conservationists who give of their professional time in classrooms commonly feel the hopelessness of the size of the teaching job to be done, important as it is.

WUC Frederick Bubb and supervisors of the Lehigh County District in Pennsylvania found the the answer (p. 62) in a plan for teaching the teachers, rather than the pupils.

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*SARA, you're a good sponsor...*

# River authority builds watershed success in Texas

A local river authority, created by the State Legislature, keeps small watershed projects moving in the sprawling San Antonio River Basin of Texas and sees that water-control installations are maintained in first-class condition after completion.

SARA, as the San Antonio River Authority is called locally, has 26 floodwater-retarding dams under its care; two more are under construction.

SARA has spent $130,000 to speed up the planning of six watershed projects; two more are being planned and others will follow. Every project underway in the basin has been planned at least partly with local funds.

Construction has been completed in three SARA-sponsored watershed projects and is underway in another.

The authority was created in 1937 by the Texas Legislature. Its objectives were to seek a barge canal from the Gulf of Mexico to San Antonio and to promote flood control and soil conservation.

The authority has been interested in watershed projects since the 1940's. It provided money in 1951 for watershed planning by the Soil Conservation Service before the pilot watershed projects were authorized.

SARA helped organize soil and water conservation districts so all land in its basin would be eligible for the conservation assistance districts can provide. The authority works in cooperation with the Soil Conservation Service; the Hondo Creek Watershed Improvement District; and the Alamo, Wilson County, and Karnes-Goliad soil and water conservation districts.

The authority co-sponsored two of the first pilot watershed projects completed in the country, Escondido and Calaveras creeks. The model watersheds have helped sell thousands of people on watershed work.

In a 1961 reorganization, SARA's responsibilities were expanded to include pollution control, recreation developments, and irrigation. A 12-member board of directors, assisted by a manager, operates the authority.

SARA maintains completed dams. It acquires land rights, administers contracts, and establishes vegetation on new floodwater-retarding dams.

One of the things that makes SARA unique is the way it maintains the grass cover on dams in the basin.

The authority has two maintenance field units, each of which has tractors, mowers, weed sprayers, fertilizer drills, and irrigation

**Espada dam, built by Franciscan Friars in 1731 to take irrigation water out of the San Antonio River, was restored by SARA working with the San Antonio Conservation Society. The acequia, visible just to the left of the tree in the center, carries water 5 miles downstream to an old mission.**

Dense bermudagrass on the dam on Martinez Creek is typical of the cover SARA maintains on its floodwater-retarding structures. Con Mims (left), SARA special projects coordinator, and Billy Griffin, SCS work unit conservationist, with other officials decide each year what work is needed to maintain them in good condition.

equipment. These units also will operate and maintain public parks SARA is building on land bought to help clear easements.

When all projects are completed, five maintenance units will be set up to care for the watershed protection projects.

SCS Work Unit Conservationists Billy Griffin of San Antonio and Roy Freeman of Kenedy help the authority plan work to be done on every dam each year. They meet annually with SARA's Operations and Maintenance Division and appropriate conservation district supervisors. Decisions are reached as to which dams need fertilizer, irrigation, weed control, spot planting, or other measures. SARA then does the work.

SARA even grows its own bermudagrass sprigs for maintaining the dams.

SARA cooperates with the State Highway Department by providing topsoil from the excavation above a floodwater-retarding dam to be used to help establish grass on slope cuts on a nearby freeway.

Part of SARA's success in watershed projects and other conservation activities is due to the way it keeps the public informed. The authority publishes a conservation newsletter and holds public workshops to discuss watershed progress and needs. It also gives certificates of appreciation at public occasions to landowners who grant easements for floodwater-retarding structures.

The authority's work also includes conserving natural beauty and historical landmarks. A dam and acequia (irrigation supply ditch), installed by Franciscan Friars on the San Antonio River in 1731, was in danger of being bypassed and dried up by a channel improvement project on the river. Through the efforts of SARA and the San Antonio Conservation Society, flow to the dam and acequia was maintained. They were preserved intact, then restored and beautified.

By being concerned with all the land in its river basin, and emphasizing soil and water conservation in all its aspects, SARA is benefiting the entire San Antonio River basin. ♦

# Wheat farmers improve equipment for more effective stubble mulching

**By Hans A. Krauss**
*Work unit conservationist, SCS, Warden, Wash.*

Pacific Northwest and Great Plains wheat growers may benefit from the ingenuity of three cooperators of the Adams Soil and Water Conservation District in Washington who improved their stubble-mulching programs with simple equipment modifications.

The changes are typical of the many adaptations that conservation farmers and equipment manufacturers are constantly making to get more effective conservation results from farm implements. The three contributions from the Adams District are:

(1) Addition of a plate to the conventional chisel for stubble-mulch plowing, by Don Schwisow.

(2) Conversion of a rotary hoe into a rotary mulcher, by Dick Telecky.

(3) Plugging the holes in skew treader wheels to keep them from filling with straw, by Joe A. Huddle.

Chiseling is a common form of plowing to leave wheat stubble on the surface for soil protection. Chiseling in the fall retards germinated weeds, such as cheatgrass, and opens the compacted soil to permit better penetration of rainfall. Chiseling should be done across the slope and as near the contour as possible.

## Chisel and plate

Cooperator Schwisow adds a plate to each chisel on his plow to increase the stirring and roughening of the soil. The plates leave most of the stubble on the surface, Schwisow says, and leave the soil more open than standard chisels. He tells how to make the plates:

From a piece of 3/16-inch steel, cut pieces 7½ inches long by 6 inches wide. Taper the sides to the width of the shank at the bottom. Drill two holes to fit the two bolts that hold the chisel point on the shank.

The top part of the plate should run slightly below the surface of the soil when the chisel penetrates about 10 inches.

## Rotary mulcher

Dick Telecky, Schwisow's neighbor, has modified a rotary hoe to keep it from being plugged up with straw and uses it as a rotary mulcher.

He took a section of a rotary hoe that has two rows of seven spiders (toothed wheels) and reversed the end spiders of the back row so that the fingers point away from the direction of travel. All the other wheels were left in their normal

Dick Telecky (left) discusses his rotary mulcher, a modified rotary hoe, with former SCS Conservationist Larry Thola. The stubble on the right has has been worked with the mulcher.

Stubble-mulching plate (above) added to conventional chisel by Don Schwisow tapers from 6 inches wide at top to width of shank at bottom. Joe A. Huddle (right) shows how he plugs the holes in skew treader wheels to keep them from catching straw. A piece of cheesecloth on the ground beneath the wheel serves as a form to hold the mixture of cement and metallic grouting aggregate.

positions, with the teeth pointing in the direction of travel.

The center spider and both end spiders of each row are made fast to the center shaft with a ¼-inch machine bolt through each hub and shaft. These six pinned spiders act as drive wheels and clear the machine of straw.

Telecky combines 16 sections into a mulcher 56 feet wide. He uses a 3-inch diameter pipe supported on five rubber mounted wheels for a hitch. For proper handling, the cables are adjusted so that the distance between the tractor and the hitch is half the width of the implement (28 feet for the 56-foot-wide mulcher). Weights can be added if desired.

### 25 acres an hour

The 56-foot-wide mulcher covers more ground than most stubble tools; it easily completes 25 acres an hour. It also scatters straw better than the skew treader.

The flexible implement works well in draws, or "coulees." Eroded hillsides benefit because of its tendency to carry straw from the draws to the sidehills. Several extra trips can be made through the draws to break down the heavy stubble and transport it to the hillsides without overworking the soil. The rotary mulcher will not tear up a heavy, well-established sod nor will it do well in rocky ground.

In hilly terrain, an HD-9 or DC-6 tractor is needed to power the wide implement. In level fields, a smaller tractor will do. The number of sections can be reduced if tractor power is limited.

### Improved skew treader

Joe A. Huddle of Washtucna has a simple method of altering the spoke-wheel skew treader so the wheels will not plug up with straw. He fills the openings in the wheels with ferrolith G nonshrink metallic grouting aggregate mixed with cement.

To make a form, he simply lays a piece of cheesecloth on the ground and places the wheel on it with the hub extending through a hole and pressed slightly into the soil. He fills the openings with the mixture, smooths it with a trowel, and lets it harden, forming a solid wheel that does not catch straw.

The 18-pound wheel weighs about 24 pounds after this treatment. With 18 in a section and 10 sections, the additional weight is 1,080 pounds to the gang.

These three innovations by cooperators of the Adams District may help in applying better stubble-mulch programs. ♦

# Sod farm converts soggy fields into showplace as "biggest lawn in township"

**By Frederick A. Mahn**
*Work unit conservationist, SCS, Mount Holly, N. J.*

The "biggest lawn in Springfield Township" used to be under water 3 to 4 months at a time. The only crops that could be grown there were soybeans, corn, and poor-quality hay; even they drowned out in wet years.

Now people slow down when passing the Mercer Sod Farm to see the transformation that has taken place. Residents of the area say that "all Burlington County should look more like that."

The Mercer Sod Farm of 475 acres is operated by the four Cacavio brothers, Dominick, James, Frank, and Victor. As cooperators with the Burlington County Soil Conservation District, they had the assistance of SCS conservationists in designing a system of ditches to get rid of water that stood in surface depressions and in planing a sod-production program with maximum safeguards for soil resources.

Mercer Sod specializes in growing mixtures of Kentucky bluegrass and Merion bluegrass. The farm has provided sod for the West Point Military Academy, Convention Hall in Atlantic City, Trenton Cultural Center, Princeton University, Yankee Stadium, Princeton Day School, Roosevelt Stadium in Jersey City, Military Park in Newark, the New York Park Department, and numerous golf courses throughout the State.

The farm is laid out in a network of well-graded roads so that heavy equipment can get close to each sod-cutting site, and loaded trucks can leave without becoming bogged down.

"Our operation is geared to top efficiency, and we eliminate as much hand labor as possible," explains Victor Cacavio. "We can't make a profit by hand-lugging each strip of sod a hundred feet, then have to pull the truck out of the mud."

As many as 15 persons are employed during the sod-cutting season, which runs from April to October. A permanent crew of eight men plant, raise, and mow the grass during the rest of the year.

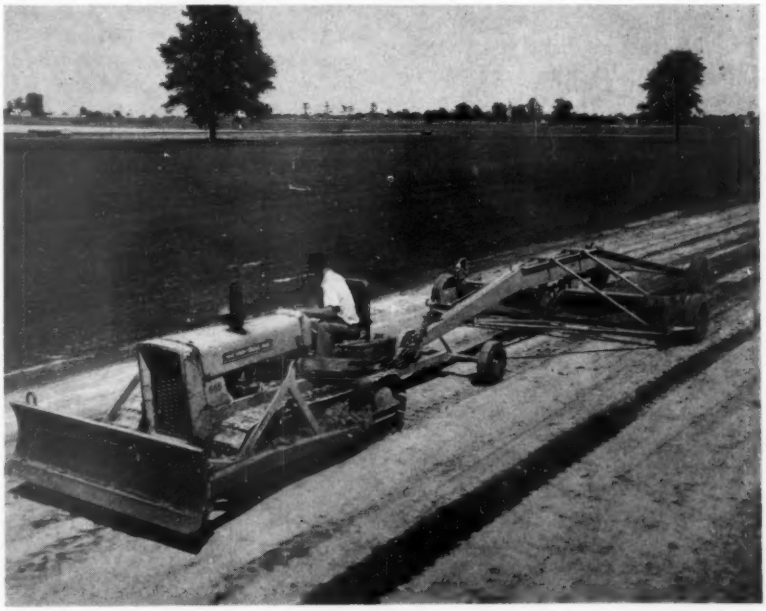
The Cacavios expanded Mercer Sod's operation 2 years ago when they bought two additional farms, and thus added 213 acres to the original 140. At that time they made an overall conservation plan with the help of the SCS staff. Since then they have added another 122 acres.

"We had to rely completely on surface drainage because our soil is so heavy (clayey)," Victor Cacavio said. "The SCS men came up with a plan to run the ditches into one end of each of our three irrigation ponds and out the other end. This way, we keep as much rainwater on the farm as we can without ruining the sod. They suggested several diversion channels to run crosswise on our 40-acre sloping field to stop the lower half from eroding after we cut sod. We find these diversion channels also keep water off the low flat areas."

The results were so satisfactory that the owners decided to build a shallow V-shaped grass-lined ditch in each field and also to reshape the land before each seeding of grass.

The Cacavios use all the earth that is dug from ditches and ponds to shape and grade the sod fields. The grading serves a double purpose by permitting an even distribution of irrigation water along with the drainage benefits. ♦

**Fields on the Mercer Sod Farm are leveled before each planting to make efficient use of irrigation water and facilitate drainage in wet seasons.**



# Contractors learn survey techniques

Carroll Drablos, University of Illinois extension engineer, levels the instrument as Contractor Robert Goodwin of Kankakee looks on. Clyde Day, president of Illinois Land Improvement Association and John Whelan, SCS area engineer, steady the rod.

Benchmarks and backsights became common terms for 229 conservation contractors in Illinois recently. Seven engineering survey workshops were sponsored by the Illinois Land Improvement Contractors' Association, the University of Illinois Cooperative Extension Service, and the Soil Conservation Service. The 2-day workshops were designed to prepare contractors for surveying more of the smaller conservation jobs.

The schools were planned after land contractors displayed a strong interest in learning the survey skills they need to do their job well.

In order for farmers to receive cost-sharing payments for construction work, SCS conservationists must check the completed projects. As more farmers request payment for conservation projects, SCS workers have not always been able to check each step as soon as it is completed. So the time required to do a job sometimes drags out while both the farmer and contractor wait for approval.

The contractors felt that if they could stake out and check some smaller jobs, they could leave a finished project before the final SCS check and be confident that they would not have to return.

The arrangement also saves time for SCS employees. State Conservationist L. H. Binnie says, "It eliminates our technicians having to live on the job. This is important when *our work force* is assuming an ever-increasing workload without increase in personnel."

Professors Ralph Hay and Carroll Drablos, agricultural engineers of the University of Illinois, conducted the schools with help from SCS area engineers in the seven locations. Professor Hay says, "This year's classes dealt with the basic principles of surveying. Next year we plan to make actual surveys for some of the major conservation practices."

Clyde Day, conservation contractor from Gibson City and president of Contractors' Association, says the workshop will benefit contractors not only by saving time but also by helping them to get more jobs. "If a contractor can show the farmer that a job is feasible by running a quick survey, he can sell the job right on the spot."

These schools benefit the farmer, contractor, and SCS, but even more important they help to put more conservation on the land. ♦

## Community benefits from training work

The Soil Conservation Service along with other public service agencies is helping improve the skills of earthmoving equipment operators at the Operating Engineers' Training Center established at Woodsfield, Ohio, under the Manpower Development Training Act.

The result is better jobs for the operators who complete the training. A byproduct is a half-million dollars worth of construction work completed to date by the students in the training process.

SCS helped plan and lay out and supervise the grading of a new airport and a modernized fairgrounds for Monroe County, on which the student operators worked. By the end of the first year, about 200 young men from all parts of Ohio had gained experience under skilled supervision in the operation of bulldozers, scrapers, graders, industrial tractors, ditching machines, and the like, and had completed courses in surveying, maintenance, and welding.—NEAL C. BEERY, *work unit conservationist, SCS, Woodsfield, Ohio.* ♦

# Getting equipped for conservation work

**By G. E. Ryerson and D. A. McAllister**

*Director, Administrative Services Division, SCS, and vice-chairman, Soil and Water Conservation Committee, Farm and Industrial Equipment Institute.*

One of the most significant single contributions to resource conservation progress in the past 20 years can be attributed to, of all things, a committee.

It was a Soil and Water Conservation Committee formed some 20 years ago by the then Farm Equipment Institute, now the Farm and Industrial Equipment Institute (FIEI). In the 1940's that organization recognized that effective soil conservation required a joint approach—by those who understand the shape land must take to be fully productive, and those who know how to build equipment to reshape the land. It was an early attempt to share and blend the knowledge of both arts to the landowner's ultimate benefit.

### Dealers and districts

From that beginning, several projects soon took shape. One of the earliest was the "Dealer-District" program.

This program was developed primarily to show dealers in particular, and the industry in general, that agriculture was changing, and that cooperation with soil and water conservation districts was a practical way for farm equipment dealers to become acquainted with the changes taking place in their trade territories.

A booklet, entitled "The Farm Equipment Dealer and his Soil Conservation District," was published to explain the workings of a district—a new type of institution at that time unfamilar not only to dealers but also to most merchants.

The program also included many promotions, such as awarding plaques to dealers for outstanding participation.

### Other projects

Another later project of the Soil and Water Conservation Committee was the production in cooperation with the National Association of Soil Conservation Districts of a soil stewardship movie entitled "The Earth is the Lord's." The film has been made available to many local groups through the Institute, soil conservation districts, and churches. A total of 1,200 copies has been made. Already shown to millions of viewers, the film has helped bring about greater awareness and understanding of the importance of soil and water conservation.

The Soil and Water Conservation Committee was the original sponsor of the National Association of Soil and Water Conservation Districts' newsletter contest. The contest has been expanded several times to encourage more districts to produce newsletters.

Much of the work being carried on by conservation districts included the reshaping of farmland by construction of terraces, waterways, and farm ponds, by land leveling for irrigation and drainage, and by many other operations. At first, this work was done mainly by the farmers themselves. But more and more small contractors entered the picture, calling themselves terrace or pond builders, drainage contractors, or land-leveling contractors, and the like. Many of them began to call themselves conservation contractors.

Some of these men organized into State groups. Eventually, several State groups in the Midwest combined into a loosely knit organization called the Land Improvement Contractors of America.

At about this time, the watershed program began to be a major factor in earthmoving activities. As more and more contractors participated, equipment manufacturers found them a growing factor in their annual sales.

The Soil Conservation Service and the equipment manufacturers both began to feel the need for some means of talking to these groups collectively, to explain the kind of work expected, and to recruit more capable and conscientious contractors for conservation construction. At that time, there was no nationwide group to represent the small contractors.

Many of the larger operators were members of the Associated General Contractors. FIEI's Soil and Water Conservation Committee, with SCS support, decided to encourage the further development and strengthening of the Land Improvement Contractors of America.

### Contractors' workshops

A workshop was held in Oklahoma City in January 1963 where contractors, engineers, and administrators discussed problems of improving performance through better understanding of work to be performed, more efficient methods of earthmoving, and better business management. The presentations were made by experts from FIEI member companies and from the Soil Conservation Service. Response was favorable, and the workshop was repeated. Since 1965, three workshops have been held

each year, and the participation is impressive.

In 1964, members of the equipment industry were asked to participate in an SCS-sponsored series of contract administration training meetings. This series served to acquaint FIEI members with problems of contract administration and legal requirements in carrying out watershed work by contract and to bring about a better understanding on the part of contractors, manufacturers, and SCS personnel of each other's problems.

Primary objective of both the manufacturers and SCS has been to encourage contractors to consider themselves equal partners in the conservation program, in which well over a billion cubic yards of earth are moved each year.

The importance of watershed work performed under contract through competitive bidding has been recognized by the Associated General Contractors, which now has established a permanent Soil Conservation Service Liaison Committee. The committee meets at least annually to discuss problems of mutual concern to both contractors and SCS. Additional liaison committees are now being set up between the Associated General Contractors and various SCS State offices. These committees have brought about a better understanding of what is being sought by the Government in watershed project contracts and the basis on which contractural problems can be solved.

Twenty years ago the FIEI served as a catalytic agent in the development of an effective national soil conservation program. Today, conservationists in the Soil Conservation Service and equipment manufacturers and dealers and earthmoving contractors through their organizations are bringing their special talents to bear on the problem in a continually more sophisticated manner that bodes well for the improvement of our country's natural resources. ♦

## To the Grange, conservation is "special"

**Maurice Gross, *Grange Herald* business manager, Mrs. Adelaide Perry, managing editor, and Charles Boothby, executive secretary of the Maine Soil and Water Conservation Committee (left to right) plan the 18th annual soil and water conservation issue of the Maine *Grange Herald*.**

The Grange in Maine this year published the 18th consecutive annual Soil and Water Conservation special edition of its statewide newspaper, the *Grange Herald,* which is received by more than 22,000 families.

One of the aims of the Grange is to make people aware of the need of conserving natural resources, says Mrs. Adelaide Perry, managing editor. The *Herald* is used to attain this objective.

Maurice Gross, *Grange Herald* business manager, Charles Boothby, executive secretary of the Maine Soil and Water Conservation Committee, and Mrs. Perry plan the paper's layout. Forty-seven articles and eighty-one photographs were submitted by Maine's soil and water conservation district supervisors, State and Federal conservationists, and many nonprofessional conservationists for this year's 44-page special edition.

The *Grange Herald* annually recognizes outstanding accomplishments of conservation district supervisors. The State Grange Master presents the five outstanding district supervisors with individual cups and citations.

"In order for a person to be a good Grange member, he must be a good conservationist. And all good conservationists should be Grange members," says Mrs. Perry.—LAUREN H. LONG, *assistant to State conservationist, SCS, Orono, Maine.* ♦

## "America The Beautiful" a teaching aid

A set of "America The Beautiful" photographs is being used as a teaching aid in India.

Most of the people for miles around Mahorashtra are farmers, and Joy Stevens, Peace Corps volunteer, finds that such pictures as field stripping, farmstead windbreaks, a parallel-terraced alfalfa field, contour stripcropping, and contour irrigation of ricefields are beneficial to this area.

He plans to change the name of the exhibit to "The American Farm" and use it as a teaching device for the village farmers. ♦

# Technical standards strengthen Turkey's irrigation projects

**By C. D. Brehm,**
*State conservation engineer, SCS, Huron, S. Dak.*

Topraksu, Turkey's soil and water conservation agency, is constructing reservoirs to store runoff water for irrigation of farmlands. It hopes to build about 200 irrigation reservoirs a year following procedures similar to those used in small watershed projects in the United States.

Since technical guidelines, standards, or handbooks are at a premium in Turkey, Topraksu and the Agency of International Development requested the Soil Conservation Service to furnish technical help on the design and construction of earth dams.

I arrived in Turkey in June 1966 on a 90-day assignment. After a briefing with AID and Topraksu officials, I made trips throughout the country observing existing irrigation structures as well as those under construction or proposed for future work.

### Turkey's construction program

Most structures range in height from 20 to 40 feet and store up to 1,000 acre-feet of water. Each structure will irrigate 200 to 1,000 acres of land. Little use is made of principal spillways to control high flows, since the structures utilize irrigation outlets to draw down the stored water, and the flood flows are conveyed around the structures in rubble masonry or concrete chute spillways. Heavy equipment is generally used to place the rolled earthen embankments, but all other work is performed by hand.

Quality of design procedures and construction were related directly to the Turkish engineers' experiences and abilities. The engineers who had visited the United States and other countries were technically more proficient than others but did not always have the knowledge to carry the projects to completion without error. The extreme variability in technical approaches indicated the need for general design and construction standards.

After providing onsite technical assistance and becoming acquainted with their problems, I helped Topraksu engineers develop several standards which provided guidelines to field personnel. These standards served to improve their hydrologic approach, hydraulic design, determinations of sedimentation rates, and, finally, the construction being performed.

### Uniform standards help

This information was presented to a group of engineers from Topraksu in a week-long seminar. Following this, a technical committee reviewed the standards, interpreted them into the Turkish language, and will soon issue them to field personnel.

The completed standard should be useful to Toprasku in uniting their effort for greater technical advancement. As we in the United States know, approved standards do not destroy individual efforts but enhance them because they provide opportunity for everyone to contribute to their original development and to make suggestions for their improvement.

Whenever a series of climatic events produce an effect on structures which are designed and constructed to uniform standards, a bench mark has been established so that future evaluations are more fruitful. Areas for improvement are quickly defined, and technical advancement is assured.

Topraksu expects to move forward in this manner. Turkey has the ability, the agressiveness, and will to develop. ♦

Topraksu personnel wih National Engineer Omer Bey (extreme left) examine test hole to determine foundation materials for the proposed Yediker Reservoir in north central Turkey.

*An idea that holds water...*

# Balloon dams keep celery in Celeryville

**By Karl Reinhardt**
*Soil conservationist, SCS, Norwalk, Ohio*

Imagine building a lake with a dam made of a long water-filled ballon fastened to a concrete slab set in the ground.

You could make the lake as deep or as shallow as you wanted by filling or emptying the balloon. Or you could drain it by emptying the balloon completely.

This idea is being used in the Celeryville Conservancy District at Celeryville, Ohio. Four balloon dams built into drainage ditches have changed the whole outlook of the community.

At Celeryville, landowners grow celery, lettuce, radishes, carrots, and green onions on about 1,200 acres of deep muck soil.

In the past, the cropland flooded after heavy rains because the water ran off the higher land into the low-lying muck area. Damage amounted to as much as $70,000 a year.

Then, if it didn't rain during July and August, the crops dried up. Many growers drilled wells to irrigate their crops, but they never had enough water.

The growers organized the Celeryville Conservancy District in 1953 to try to solve their problem of having either too much water or not enough. Soil Conservation Service engineers helped the district make a plan for controlling the water. It called for widening existing drainage channels to 50 feet so they would carry away floodwaters before they covered the fields.

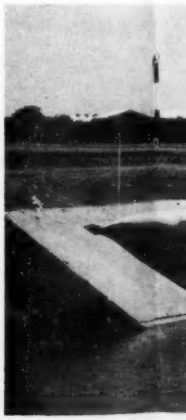
A 75-acre reservoir was built alongside the main drainage channel. It is filled by pumping floodwater from the channel during winter and early spring, then letting it out slowly during the summer to irrigate the crops.

The improved drainage channels carry the irrigation water to the growers' fields, where the balloon dams hold it until it is pumped onto the land. In some cases it is distributed in reverse through the tile drainage systems.

When it rains, the dams can be partly emptied to let the extra water entering the channels pass over the top. In a severe storm, they can be completely emptied to

**Channels are designed to carry surface water from the fields and to distribute irrigation water.**

**The balloon dam is made of rubber and can be filled with water to any height desired to control the water level in the ditch.**



Harvesting vegetable crops provides many jobs in the Celeryville area.

A 75-acre reservoir stores water pumped from the ditches in wet seasons to be used for irrigation later.

use the full depth of the channel to carry away the floodwater. Then the dams can be pumped up again to hold back more irrigation water.

After a 5-inch rainstorm, John Buurma, who farms more than 500 acres of muck, commented, "Ordinarily we would have lost half our potato crop in a storm like that, but only about 2 acres was damaged."

The Celeryville muck soil is about 75 percent organic matter. When it dries, it is slowly oxidized. In the past, this caused a loss of about ¾ inch of muck a year. At that rate, in 40 years 30 inches of the soil would be gone, and much of the land would not be useful for growing vegetable crops.

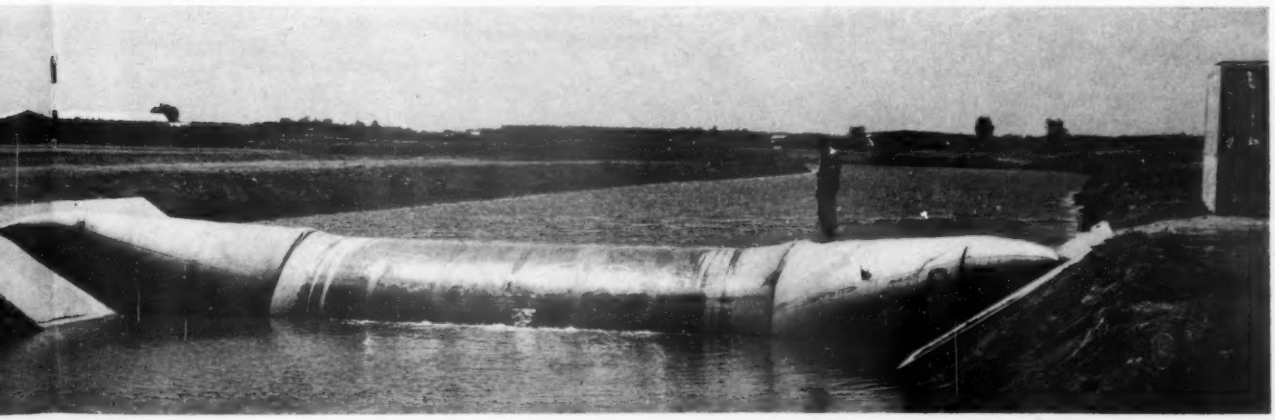
By keeping the muck wet throughout the season, the oxidation, or subsidence, is slowed down to less than ½ inch a year. Danger of muck fires is also ended.

Each year in late May, after most of the vegetables are planted, but while the plants are still small, another problem appears. When dry, the surface muck is so light that the wind blows it up into black dust clouds. Windbreaks and cover crops have been established to reduce wind erosion. Farmers also sprinkle the muck to keep it from blowing. The new reservoir and irrigation storage give the growers enough water to keep the soil surface wet when there is danger of wild erosion.

When there is danger of frost, sprinkling is used also to keep the plants from freezing.

The total average benefits from the project are estimated at about $190,000 each year. About $100,000 of this is from the reduced flooding and $90,000 from the irrigation water being available for growing vegetables and reducing oxidation and wind erosion of the soil. The total cost of the project is about $1.4 million dollars.

Ben VanZoest, former vegetable grower who is now the contracting officer for the Celeryville Conservancy District, says, "The improvements in flood control and irrigation water supply have increased the grower's returns by at least 25 percent." ♦



*Learning to teach about resources . . .*

# Training sessions help teachers to take conservation into their classrooms

**By Frederick E. Bubb**
*Work unit conservationist, SCS, Allentown, Pa.*

Several times a week your office phone rings and a voice says, "I'm a teacher and we're starting a unit on conservation. Could you come out and speak to the class? Could you make it for a half day? I really don't know much about conservation."

Soil Conservation Service employees of the Allentown, Pa., office discussed this matter with directors of the Lehigh County Soil and Water Conservation District and representatives of the district's other cooperating agencies. They found that the other agencies were having the same problem of too many requests and too little time to fill them.

The problem appeared to be that many school teachers have little training in natural resource conservation. They are at a loss, therefore, when called upon to include some attention to conservation in their classes in the traditional subjects taught in elementary and secondary schools. It is then that they call on the conservation agencies for help.

### Teach the teachers

The district directors and conservationists concluded that the solution would be for the professional conservationists to educate the teachers so they would feel qualified to teach the subject.

How could this be done? They decided to start at the top. They went to Dr. William Bartholomew, county superintendent of schools, and to Henry Messinger, head of science education for the Allentown schools. They found both men enthusiastic about setting up a teacher-education program in conservation.

The first all-day training session was held at Camp Horseshoe in the fall of 1964. Forty-five teachers from the Allentown schools attended. The following year, 100 teachers from the county schools took part. From now on, all-day outdoor training sessions are to be held—one in the fall at Camp Horseshoe for 110 county teachers, the other in the spring for 70 Allentown teachers. The latter is held at the city of Allentown fish nursery along Little Lehigh Creek.

The program is now well established. The Lehigh County District sponsors the program, and local "talent" does the teaching.

At each session, the first hour is devoted to lectures. Grant White, head of the Lehigh County Cultural Center and a former science teacher, presents an illustrated talk on the materials available locally for teaching about natural resources. Miss Ethyl Evans, a Parkland High School English teacher, tells how she uses conservation in her classes. Her point is that conservation does not have to be limited to science classes. She also uses the out-of-doors for teaching because she finds that her students are motivated more in this environment.

### Rotating sessions

The teachers are divided into four groups and attend four training centers on a rotating basis. These are operated by local personnel of SCS and Pennsylvania's Game Commission, Fish Commission, and Department of Forests and Waters. All instructors strive to keep the sessions informal.

For proper environment, the

**Grant White, head of the Lehigh County Cultural Center, explains plans for the future in a section of Parkland High School's outdoor conservation laboratory. This part of the laboratory is an abandoned iron-ore mine.**

training centers are located in areas that have a stream, an open field, and woodland.

If demand is a guide, the training sessions are a success. For last fall's sessions, for example, more than 300 county teachers applied.

The Lehigh County District also sponsors a 5-day "in-service" program in cooperation with the office of the county superintendent of schools. This detailed training program is designed as a follow-up of the 1-day training sessions. For the first 4 days, specialists of one agency each day take the teachers to the field for practical experience in resource education. On the final day, a session is conducted in an outdoor environmental laboratory. This session gives the teachers suggestions on how to use the training they have received.

What is the program's future? The county has 1,800 teachers and the city of Allentown, 1,700. Both groups hope to have every teacher attend at least the 1-day session.

Six of the 10 school districts now in Lehigh County have established or are establishing an outdoor conservation laboratory. These vary in size from a few to 48 acres. Two are at elementary schools. Three are located at the high school, and one serves both elementary and high school. All are being established with student labor, much of it during school hours as a part of instruction.

In addition, about 500 teachers in Lehigh County now have a better background in conservation and will be more willing to teach conservation.

Those phone calls for classroom instruction are decreasing. ♦

## Stable water level improves wet woodlands

Timberland owners in the Dixie Soil and Water Conservation District of Florida are beginning to install water-control systems in their wet woodlands to improve the growth of valuable hardwoods, make sites more favorable for pine, and provide year-round accessibility for harvesting marketable timber.

In response to a request from several cooperating landowners, the Soil Conservation Service prepared a plan for the Pumpkin Swamp area near Cross City embracing about 34,000 acres of cypress, hardwood, and pine flatwoods.

The Hudson Pulp and Paper Corporation has begun work on a 15-mile-long main channel following natural drainage lines. Lateral channels will be added to carry excess surface water from the entire area.

The swamp will not be completely drained, however. Channels will contain control structures to stabilize the water level. The result will be favorable moisture conditions for tree growth the year around, rather than alternate flooding and drying as in the past.

SCS engineers planning the system were able to take advantage of an unusual natural feature of the terrain—a hard layer of rock, clay, and marl near the surface—to provide for control structures in the channel at low cost.

Since the channel bottom, for much of its length, would be excavated in this hard layer, it was a simple matter to leave the material in place at strategic points to control the water level. The backhoe operator, according to plan, raises the bottom of the channel to the specified level for a few feet, then resumes the deeper excavation.

Cecil James, district forester for Hudson Pulp and Paper Corporation, believes the water-control program will make the swamp a better habitat for fish and wildlife, as well as aiding timber production.

After the system is installed, deer and other game will have year-round water supply in the area. Before, they were forced to leave during extended dry periods.

Fish will thrive because of the constant water level in the channels, whereas formerly surface water completely disappeared from most natural channels.—EDWARD D. HOLCOMBE, *woodland conservationist, SCS, Gainesville, and* JAMES W. NORRIS, *agricultural engineer, SCS, Lake City, Fla.* ♦

**One of the natural rock structures in the Pumpkin Swamp main channel shows the "teeth marks" of the backhoe used in excavation. The spoil in background will be leveled for a road.**

## SCS and industry aid timberlands

Timberland owners in Conecuh County Soil and Water Conservation District, Ala., are doing a much better job in managing forest resources these days.

It all began when two conservation-minded men from the Soil Conservation Service and private industry found ways of increasing forestry income and improving the general economy of the area.

Luther Gowder, SCS work unit conservationist, and D. K. Bodiford, forester for Container Corporation of America, began their joint efforts toward woodland improvement 2 years ago. Since that time, they have been able to show landowners how to do more timber stand improvement work, site preparation and planting, intermediate thinning, and selective harvesting than they had been able to do separately.

For example, one landowner, who owns 900 acres of woodland, had been weeding his woodland for 10 years or more but had not realized any income from sale of timber. Then Bodiford helped him mark his trees for cutting. By working together Bodiford and Gowder were able to help him establish a paying forestry program.

The Conecuh County District has a large potential for further development of its woodland. About 75 percent of the district, or more than 400,000 acres, is in woodland, about half belonging to small landowners and the remainder to seven large lumber and pulpwood companies.

Recent surveys and estimates made in the county reveal that 40 percent of the woodland is understocked and 38 percent needs some kind of stand improvement. The gross income from forest products in 1964 was $1,850,000, or about one-third of what the county's timberland is capable of producing.

Each year since the conservation district and private industry began working together on woodland improvement, the income from forest products has increased. Already more than 25 landowners, owning 3,000 acres of woodland, working jointly with Gowder and Bodiford have initiated better woodland-management programs, including such practices as reestablishing pine on scrub hardwood areas, selective thinning of immature stands, and deadening of cull trees that were interfering with the growth of desirable young pines.

In 2 years, the conservation district's annual report showed the following increases in the rate of establishing woodland practices: Intermediate cutting, from 269 to 6,086 acres; harvest cutting, from 354 to 3,363 acres; and woodland weeding, from 28 to 2,044 acres.

The Soil Conservation Service and Container Corporation work with the district cooperators in a number of ways. Soil survey information and woodland-suitability guides provided by SCS give the landowners a guide to potential production, spacing, and preferred species for individual woodland sites.

Specialized forestry services, such as marking and estimating timber stands, are provided by company foresters. Both Gowder and Bodiford are able to recognize the landowner's needs and either help him or direct him to someone who can.—W. C. AIKEN, *woodland conservationist, SCS, Auburn, Ala.*

Frank Brantley, landowner; Luther Gowder, Soil Conservation Service; and D. K. Bodiford, Container Corporation of America (left to right), each stands by a young pine that has been released by deadening cull hardwoods.

## Seedlings on Laughlin Soils

Seedings on Laughlin soils have greatly improved cover and increased moisture intake as well as increasing forage yields. The seeded grasses have extended the grazing period from 8 to 24 weeks and improved forage quality in an area badly needing better forage supplies.

Laughlin soils are low in fertility, heavily leached, acid, and have a low base saturation. Soils with similar problems occur widely, and the information from the tests will be useful over a large area. ♦

## Grazing plan improves pasture

Louis Perez examines little bluestem grass in a pasture that has been deferred.

A conservation plan developed with the assistance of the Soil Conservation Service has helped Louis Perez improve his native pastures from poor to good condition on his 135-acre farm in the Calhoun-Victoria Soil and Water Conservation District in Texas.

Perez became a cooperator with the conservation district in April 1959. He soon adjusted livestock numbers to reduce grazing pressure on the pastures that had suffered heavily during the drought of the mid-1950's.

He built cross fences to divide the farm into three pastures and installed water troughs in each pasture to aid in rotation grazing.

Perez's plan provides for year-round grazing. During normal years, he feeds only protein supplements. Hay is kept for emergency.

Two native pastures are grazed in combination with 16 acres of bermudagrass during the summer. One of the native pastures is saved for winter use.

To supplement their income, both Perez and his wife work on a nearby ranch. ♦

## Flannel boards tell of conservation

"Too many cows are worse than plows."

This first-rate caption for a conservation poster was written by an 8-year-old from Laramie, Wyo.

The child's poster, along with about 400 others, was the result of a concentrated conservation education program sponsored by the Laramie Rivers Soil and Water Conservation District, Wyo.

Prior to the 1964-65 school session, the Laramie Rivers District supervisors promoted conservation education only in the upper elementary grades and in junior and senior high schools. Every year the Snowy Range Chapter of the Future Farmers of America received field and classroom training in the various conservation concepts.

Recently, the district supervisors brought conservation education to the lower elementary grades. With the younger children in mind, the supervisors enlisted the aid of the audio-visual department of the University of Wyoming, the Extension Service, and the Soil Conservation Service to plan a simple and informative method of telling the conservation story.

An additional help was a book list on conservation subjects prepared by the Albany County Public Library. This list was mimeographed and made available to all teachers in the grade schools.

A flannel board was chosen as a principal method of communication. Caricatures were used to give the flannel board a cartoon effect and helped the children see the contrasts between a poor and good farmer or rancher.

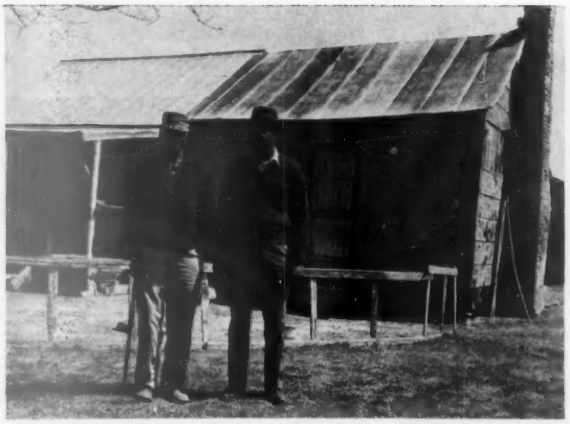
The teachers remarked that a learning situation was provided, the subject matter was challenging, and this could easily be correlated with classroom work and discussion.

The flannel board conservation story was given to 62 lower elementary grades in and around Laramie. There were about 1,600 children in this group from 5 to 10 years old. Their story was also presented on a children's program on KFBC-TV at Cheyenne.

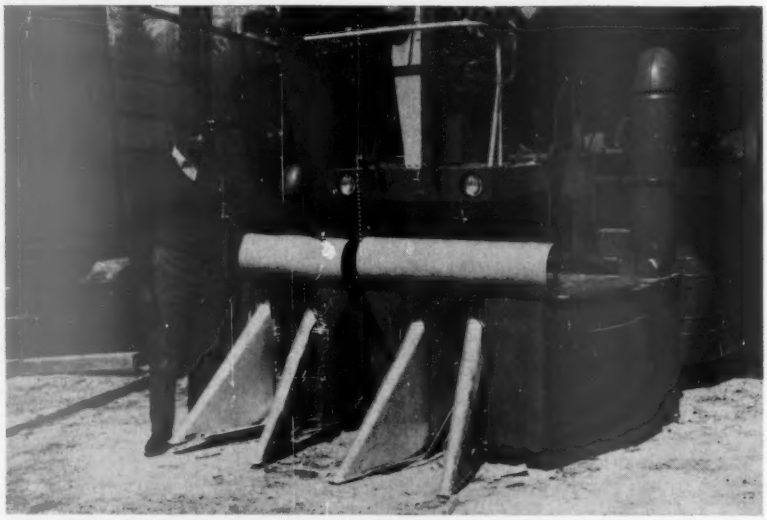
The Laramie Rivers District held its annual conservation poster contest during and after this flannel board effort. The 250 posters submitted often reflected ideas presented by means of the flannel board.

At the request of school principals, this talk was also given to about 1,400 students in the upper elementary grades. The narrative was adjusted to include technical terminology and more advanced conservation concepts. The enthusiastic response of these children indicates that the caricatures which are "more fun" than movies or slides for lower-grade students are also more interesting for upper grades.—DONALD J. HEYNE, *soil conservationist, SCS, Wheatland, Wyo.* ♦

**Land users can accomplish much conservation with cultural and management measures that involve only the proper use and management of plants and their residues on the land. ♦**



Thomas Bolton before his home with his father in 1958 (left) and with his wife in 1966.



Thomas Bolton's modern farm equipment includes a two-row cotton picker (above) and a tractor.

## Farmer builds a success story with USDA help

Nine years ago, Thomas Bolton and his father sharecropped a small 100-acre farm for a fourth of the crops as rent. Today, Thomas Bolton and his family farm 251 acres of productive land, of which they own 40 acres.

The Bolton family has been farming in Shelby County, Tenn., since Mr. Bolton was a small boy. In 1958, Bolton and his wife decided to strike out on their own. They borrowed $2,000 from the Farmers Home Administration, became cooperators with the Shelby County Soil Conservation District, and used the services of the Soil Conservation Service, Agricultural Stabilization and Conservation Service, and Extension Service to improve their farming.

They increased their net income from $1,175 the first year to $6,900 in 1963. In 1964, they purchased with an FHA ownership loan the small 40-acre farm where they now live. They own a two-row cotton picker, two large tractors, and a self-propelled combine. Their net worth has increased sevenfold since 1958 to $25,000—T. F. JONES AND JAMES ROGERS, *work unit conservationist, SCS, and county supervisor, FHA, Memphis, Tenn.* ♦

# Maine farmer first to complete program

A Penobscot County farmer and conservation district cooperator, Henry Page, is the first of 10 Maine Agricultural Conservation Program applicants to complete renovating an ugly gravel pit into an area of beauty.

The Agricultural Stabilization and Conservation Service through ACP is helping landowners renew and beautify the many unsightly gravel pits along the highways of our Nation. In Maine, ASCS set up a cost-sharing practice for shaping and seeding gravel pits for beautification.

The county extension agent developed an information program to acquaint the public with the program. The Farmers Home Administration lent special emphasis to beautification by making low interest loans available.

Mr. Page purchased an old gravel pit, with adjoining lands and buildings. At that time, he desired not only to beautify the area but to make it a source of income as well.

As a cooperator with the Penobscot County Soil and Water Conservation District, Page was helped by the Soil Conservation Service in planning the area before excavation began.

On seeing a contractor about the work, Page was told that the cost would be excessive. Page said, "Go ahead, I am paying the bills, I know what I want, and know that it can be done."

After excavation was completed, he had topsoil spread over the coarse gravel areas, and a heavy coat of barnyard manure was applied to the entire area. The soil was then disked, limed, fertilized, and seeded.

Page, a business man as well as farmer, is already realizing a return on his investment. The transformed gravel pits are taking on a new look. The first new enterprise is a restaurant which opened June 23. In late May he excavated the cellar for a 50-unit two-story motel, and construction is now underway with the opening date set for December 1967.—HENRY E. LIBBY, *work unit conservationist, SCS, Bangor, Maine.*♦

**Soil conservationist views abandoned gravel pit (above) as shown in its bare ugliness. The pit (below) is being converted into a hayland area of productivity and beauty.**

Meetings . . .

## Equipment industry group meeting to discuss resource challenges

The 74th annual meeting of the Farm and Industrial Equipment Institute in Houston, Tex., October 15 to 18, will focus on the theme, "Food, Population and the Developing World."

This meeting is the big communications event of each year for the equipment manufacturers and is well attended by leaders of this and related industries.

The Institute, organized in 1894, represents makers of more than 90 percent of all farm equipment manufactured in North America and much of that made in Europe and the rest of the free world. This amounts to more than $3 billion worth of goods annually in the United States and Canada and at least another $1 billion worth in other countries.

Prominent among the Institute's cooperative and promotional activities are programs to encourage resource conservation, directed by its Soil and Water Conservation Committee.

"In the years ahead, the farm equipment industry will continue to do everything in its power to aid, encourage, and influence all phases of conservation work," says William A. Hewitt, president of F I E I and a member of the National Advisory Commission on Food and Fiber.

"As individual manufacturers, we also will be at work to set good examples of corporate citizenship in the field of air and water pollution control and in the conduct of our businesses.

"By the year 2,000, world population will be about twice as large as it is today, unless the rate of growth changes. To feed and clothe that 'second world' of people, the less developed nations must improve their agriculture far beyond present capabilities.

"An important part of that development, of course, will be proper conservation of their farmland. A valuable service to mankind will be the export of our conservation know-how and skills to other regions of the world. This is a new challenge to the soil conservation profession and the farm equipment industry.

"This is one of the challenges we will be discussing at the Institute's 1967 annual meeting."

### Dates and places

**October 1-6,** American Institute of Planners, Washington, D.C.

**2-5,** National Association of State Foresters, Sacramento, Calif.

**13-22,** National Grange, Syracuse, N. Y.

**15-18,** American Chamber of Commerce Executives, St. Paul, Minn.

**15-18,** Farm and Industrial Equipment Institute, Houston, Tex.

**15-19,** Society of American Foresters and Canadian Ministry of Forestry, Ottawa, Canada.

**16-20,** American Society of Civil Engineers, New York, N. Y.

**17-20,** American Association of State Highway Officials, Salt Lake City, Utah.

**24-27,** American Forest Products Industries, Washington, D. C.

**26-29,** Sprinkler Irrigation Association, Scottsdale, Ariz.

**29-Nov. 1,** American Forestry Association, Las Vegas, Nev.

**November**

**5-10,** American Society of Agronomy, Washington, D. C.

**5-10,** Soil Science Society of America, Washington, D. C.

**12-15,** National Association of State Universities and Land Grant Colleges, Columbus, Ohio.

## Outdoor Recreation Activity Grows

Public participation in major outdoor recreation activities has increased by 51 percent since 1960, and the trend is accelerating, according to a report, "Outdoor Recreation Trends," prepared by the Bureau of Outdoor Recreation.

Based on a nationwide survey of summertime activities, the Bureau estimates a fourfold increase in recreation participation between 1960 and the year 2000.

The report notes that walking for pleasure has become America's most popular form of outdoor recreation. More than 67 million persons take pleasure walks, averaging some 15 occasions each summer. This is an 82 percent increase since 1960, when it was the Nation's third most popular outdoor recreation activity.

Swimming is second in the ranking of public recreation activity and will move up to first by the year 2000, if present trends continue. Driving for pleasure, first in 1960, has fallen to third position.

Following in order come playing outdoor games or sports, up 96 percent since 1960; bicycling, up 105 percent; sightseeing; picnicking; fishing; attending outdoor sports events; boating; nature walks; camping; horseback riding; and water skiing.

Since the survey was directed at summertime activities, it does not include peak season participation in hunting, snow skiing, spectator sports, and other fall and winter sports. The survey did reveal, however, that almost 17 million Americans hunt and nearly 6 million snow ski each year.

The Bureau of Outdoor Recreation compiled the statistics on outdoor recreation participation for use in preparing a long-range nationwide outdoor recreation plan. A first version of the plan is due in the spring of 1968. ♦

## Co-op Month 67 to be observed in October

Twelve Federal departments and agencies and nine national cooperative organizations will participate in observance of October as "Co-op Month 67" in Washington, D. C.

Five programs will center around subthemes of the year's theme: Cooperatives—A National Asset.

Cooperatives of all types are owned by both rural and urban people. Well over 20 million families get services through these user-owned businesses.

Among them are farmer marketing, purchasing, and credit cooperatives; housing, grocery, group health, and fishery associations; credit unions; rural electric and telephone cooperatives; and rural insurance, irrigation, and dairy breeding associations. ♦

## District helps woodland owners sell pulpwood

Cooperation among small woodland owners, the Crockett County Soil Conservation District, and a pulp and paper company in Tennessee enabled farmers to make needed thinnings in pine plantations established by the Civilian Conservation Corps in the late 1930's and early 1940's.

The plantings were made to stop erosion on small critical areas, mainly 1 to 4 acres in size. They needed thinning, but pulpwood buyers were not interested in such small individual lots.

Earl Dunlap, a longtime supervisor of the Crockett District, got nine owners to agree to thin their pines according to professional recommendations. Two others wanted to clear-cut their woodlots and put the land to other uses.

Dunlap was then able to interest the Tennessee River Pulp and Paper Company in buying the combined 30 acres of cutting.

The cooperative effort, spearheaded by the district, gave the owners an income from practicing good woodland management. — DOYLE A. TUCKER, *work unit conservationist, Alamo,* and C. M. HENNINGER, *woodland conservationist, SCS, Nashville, Tenn.* ♦

## FHA loans to increase outdoor recreation

Through credit from the Farmers Home Administration about 153,000 people will be served by 282 outdoor recreational facilities.

FHA in 1966 advanced $18.7 million in loans to groups of rural residents or individual farmers to finance farm and community recreation enterprises in 41 States.

Rural groups received most of the funds, $17.8 million, to develop 150 community-sponsored recreational facilities such as swimming pools, picnic parks, small golf courses, and lakes.

Sharing in the total loans were 132 individual farmers who received $873,000 to carry out construction, buy equipment, and pay other expenses for developing income-producing public recreation facilities on their farms. ♦

## Unfavorable soil conditions

Unfavorable soil is the dominant problem on about 55 million acres of cropland in the United States, according to the National Inventory of Soil and Water Conservation Needs (USDA Misc. Pub. 971). Of this, more than 36 million acres or 66 percent needs treatment.

Unfavorable soil is the only major problem on 19.0 million acres, of which nearly 12 million needs treatment. It is the secondary problem on about 45 million acres of additional cropland needing treatment where other problems are dominant. ♦

## RC&D projects

Resource Conservation and Development projects range from ¼ to 3 million acres and generally are larger than a single county. ♦

**Water Pollution Control and Abatement.** EDITED BY TED L. WILLRICH AND N. WILLIAM HINES. *1967. Iowa State University Press, Ames. 194 pp. $4.95.*

Ten years ago the most urgent questions concerning water were adequacy and allocation of the supply. Today, the crucial question is quality.

A seminar sponsored jointly in 1965 by Iowa State University and University of Iowa examined the problem of water quality and resulted in this book as a sequel to *Iowa's Water Resources: Sources, Uses, and Laws* based on a similar conference in 1955.

The first section looks at the water problem through the specialized vision of four disciplines: engineering, economics, law, and political science. The next reviews the water situation in Iowa. The final chapters shift the analysis to the four interest groups—municipalities, industry, agriculture, and outdoor recreation—most often involved in water-pollution conflicts.

A paper on "Agricultural Pollution—Sources and Control," by George M. Browning, regional director of North-Central Agricultural Experiment Stations, covers much the same ground as the article by C. H. Wadleigh in the September issue of *Soil Conservation.*—B. O.

## New publications

**Surface Mining and Our Environment.** BY STRIP AND SURFACE MINE STUDY POLICY COMMITTEE. *1967. U.S. Dept. of Int. 124 pp., illus. $2.00.* A report prepared in response to the Appalachian Regional Development Act which directed the Secretary of the Interior to survey the problem of surface mining and recommend to the President a long-term program for rehabilitation.

The technical working committee included representatives of 13 agencies of

the Departments of Interior, Agriculture, Army, Commerce, and Health, Education, and Welfare, plus the Tennessee Valley Authority and the Appalachian Regional Commission.

The result is a comprehensive view of the extent of surface mining in the mainland United States and its effect on land and water resources, presented in the colorful and dramatic style that has characterized recent publications of the Department of the Interior.

The recommendations call for reclamation by the owners of lands mined in the future and Federal assistance in reclamation of previously mined areas.

**Food and Fiber for the Future.** By National Advisory Commission on Food and Fiber. *1967. Government Printing Office. 361 pp. $1.25.* The report to the President by the commission established by Executive Order in November 1965 to appraise agricultural and foreign trade policies contains a 20-page chapter on natural resources. A number of conclusions and recommendations bear on programs of resource conservation.

In describing the facts about the country's soil and water resources, the report leans heavily on the Conservation Needs Inventory. It contains a section on the water problem, asserting that, as with soil, there is no real shortage but more a matter of proper management and allocation. It contains sections on forestry and rangeland.

The findings and opinions of the commission undoubtedly will weigh heavily in consideration of resource policies and programs for the future.

**Agriculture/2000.** *1967. U.S. Dept. Agr. 72 pp., illus.* Gathered into this booklet are six addresses of the Secretary of Agriculture that summarize the current philosophy and goals of the Department.

The "blueprint for action" looks to the future in six specific areas around which the activities of the department are currently organized. They are: (1) Income and Abundance, (2) Communities of Tomorrow, (3) Resources in Action, (4) Growing Nations—New Markets, (5) Science in the Service of Man, and (6) Knowledge for Living.

This booklet is to be regarded as a policy handbook for all empoyees of the Department.

**Science and the City.** *(1967). U.S. Dept. of Housing and Urban Development. 43 pp., illus. $0.45.* Summary of a 3-weeks' Summer Study on Science and Urban Development in 1966 sponsored by the Department of Housing and Urban Development and the Office of Science and Technology of the Executive Office of the President.

**A Strategy for a Livable Environment.** By the Task Force on Environmental Health and Related Problems. *1967. U. S. Dept. of Health, Education, and Welfare. 90 pp.* A task force created by DHEW Secretary John W. Gardner recommended action goals on 10 items of concern to that Department; namely, air quality, water quality, waste disposal, population research, urban improvement, control of chemicals and synthetic materials, consumer protection, radiation control, occupational disease and safety, and standards for physical and mental health for housing, urban development, and transportation.

**National Wildlife Refuges, 1966.** *1967. U.S. Dept. Int., Bur. Sport Fisheries and Wildlife Resource Pub. 32. 29 pp., illus.* There are 312 refuge units in all but five States, with a total of about 28½ million acres in the system. This publication reports on the functions of some of the refuges, presents information on endangered species, and explains the establishment of the Job Centers on four of the refuges.

**Catalog of Federal Assistance Programs.** *1967. Office of Economic Opportunity. 701 pp.*

**Land Forming.** By Lee F. Hermsmeier. *1967. USDA Leaflet 539. 6 pp., illus.* A means of controlling surface water on level fields.

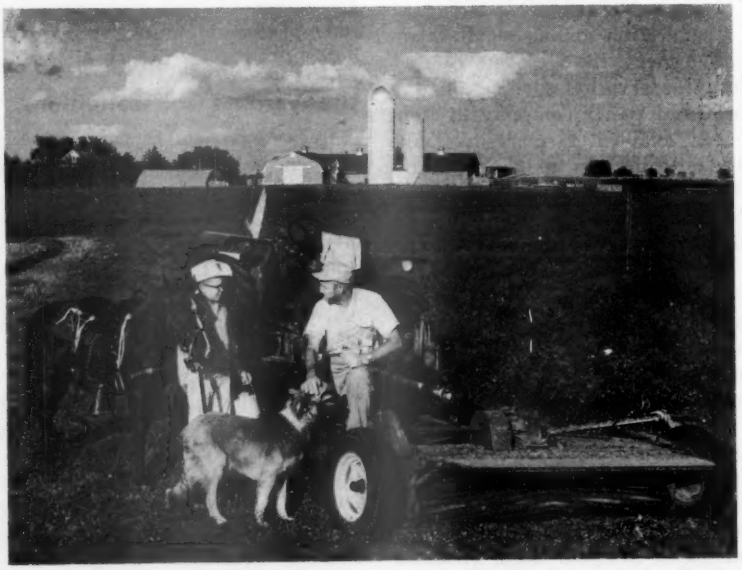
**Soil and Water Conservation Around the World,** 1967. *USDA Soil Conservation Service. 32 pp., illus. $0.25.* Written in three languages for the 1967 Boy Scout International Jamboree held in Idaho, this book of pictures helps to show the practical application of conservation principles and to tell the story of soil and water conservation in many countries.

**Effects of Monolayers on Insects, Fish and Wildlife.** By William J. Wiltzius. *1967. U.S. Dept. Int. Bureau of Reclamation Research Report No. 7. 67 pp., illus. $0.50.* This seventh report evaluates the influence on insects, fish, and wildlife of long-chain alcohol monomolecular films being used in the longe-range research program to reduce evaporation losses in reservoirs.

## Soil survey

**Iowa County, Iowa.** By J. D. Highland and R. I. Dideriksen. *1967. 162 pp., illus.; maps 4 inches to the mile (1: 15,840).* Fieldwork by J. D. Highland, W. D. Frederick, W. L. Fouts, M. P. Koppen, A. R. Hidlebaugh, S. M. Smith, and G. H. Simonson.

## AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



*America The Beautiful—Illinois* USDA SOIL CONSERVATION SERVICE

PARALLEL-TERRACED ALFALFA FIELD, OGLE COUNTY SOIL AND WATER CONSERVATION DISTRICT

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From the Administrator:

# *Industry a Partner in Soil Conservation*

The extensive system of conservation programs now available to American landowners and to the communities in which they live is a result of the cooperation and involvement of the people the programs are designed to help.

Industrial and commercial interests have participated in this cooperation on equal terms with private citizens and local organizations. The farm equipment industry and related interests have been particularly active partners in the conservation movement. The progress of conservation work on the land has profited as a result, because of the importance of adequate equipment to perform the great volume of construction and land treatment needed all across the American land.

Soil and water conservation brought many changes in farming methods and called for new kinds of farm equipment to carry out the operations. Following World War II, equipment manufacturers and dealers joined with conservationists and landowners to meet the growing demand for conservation equipment.

Landowners had much catching-up to do in the conservation effort to repair damages caused by intensive cultivation during the war. There was a great need for replacing farm equipment that had been purchased prior to the war and which was not well adapted to the accelerating pace of agriculture.

Farmers also needed equipment better adapted to the conservation practices then being advocated. It was a common complaint that it was difficult, if not impossible, to follow recommended practices with the equipment then available.

The Soil Conservation Service began an active period of cooperation with the farm equipment industry through its trade association, then the Farm Equipment Institute. The Service and the industry collectively analyzed the equipment requirements of the "new agriculture" and the adaptability of existing machines to those requirements; they cooperatively searched for better ways of performing such new tillage operations as stubblemulching, stripcropping, and contour farming, especially when these practices were combined with terracing and the protection of grassed waterways.

New adaptations of old machines which in turn resulted in the development of new trade patterns in the industry, were common. This was cooperation of a new sort, not only with land owners and operators but with an industry which also served agriculture.

When the watershed programs became active, an entirely new market for earthmoving equipment was created, and the construction equipment industry became interested in conservation. Before enactment of Public Law 566, agriculture had not been a market for their product. Suddenly it was. It was necessary that equipment and contractors be available to perform the huge volume of work which soon amounted to more than a billion cubic yards of earth to be moved annually.

During the same period, the Great Plains Conservation Program resulted in much additional work for the conservation contractor. Resource Conservation and Development projects and the Appalachian program also stimulated new work.

Here again, there was excellent cooperation with the equipment industry. SCS and conservation districts were able to indicate the size of the market and where future work was likely to take place. Cooperative programs were designed to help people in the industry learn how best to serve this new area of demand. In turn, the dealers began to play an active role in promoting and helping communities to develop new watershed programs.

Earthmoving or "land improvement" contractors also found a prominent place in conservation activity. An increasing amount of construction needed to be done that was beyond the means of the average landowner. Such work can best be accomplished by contractors. Contractors' trade associations cooperated with the SCS in training programs to show their members the kind of work needing to be done and the standards of performance that make acceptable work.

The needs for conservation equipment, and for efficient contractors to use it, have not been satisfied. The future holds even greater demand for the fruits of industry cooperation. Not only rural landowners but urban residents as well are becoming concerned about the availability and control of water and are demanding that flooding, sedimentation, and pollution be controlled.

Some of the exciting opportunities that lie ahead are spelled out in the new USDA publication, *Resources in Action—Agriculture /2000*. Whether the specific items set forth in this amazing look at the future all come to pass is beside the point. Many of them will, and many still unimagined will need to be done.

The Soil Conservation Service looks upon contractors, equipment manufacturers, and dealers as important and integral parts of the conservation team.

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# Spot hydrants improve irrigation efficiency

Farmers in the Sierra and Navelencia soil conservation districts in California have installed "self irrigation" systems using a new type of outlet valve that regulates water discharge to permit more efficient water management with reduced labor costs.

The "spot hydrant" outlet was invented by Ben Baxter, a district cooperator of Fowler, Calif. He dedicated the patent to the United States of America as represented by the Secretary of Agriculture.

The "spot hydrant" is a valve that serves the function of the commonly used "orchard" or "alfalfa" valve. It consists of an extendible riser that moves as a sleeve in an orifice.

The top of the riser can be adjusted to any elevation within the limits of the length of the sleeve. This makes it possible to adjust all the outlets for any one "set" to the same elevation and so they will have the same discharge. The discharge of all outlets of a "set" then can be increased or decreased by a line gate making it possible to cut back the stream size at all outlets by one simple adjustment, without resetting each hydrant.

In normal operations, all spot hydrants are open. A particular "set" of hydrants can be made to flow by raising the hydraulic gradeline in that reach of the supply pipe lateral. This is done by use of line gates.

Since the discharge of a hydrant depends on the difference in elevation between the crest of the hydrant and the hydraulic gradeline, it follows that line pressures will generally be lower than in conventional systems where discharge is regulated by valve closures of orifices. Individual hydrants can be closed off by inserting a simple plastic cap over the opening.

Another feature of the system is that it can be readily adapted to fully automatic operation by coupling it to time clocks, irrometers (tensiometers), or radio control.

A number of farms in the San Joaquin Valley have installed or converted their old pressure valves to this system.—MORRIS A. MARTIN, JR., AND DON E. DUNHAM, *work unit conservationist and engineering specialist, SCS, Fresno, Calif.* ♦